

**Discovery in the Alps of Provence (France) of a new taxon in the entirely parthenogenetic superspecies *Apatania muliebris* (Trichoptera: Apataniidae)**

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**Discovery in the Alps of Provence (France) of a new taxon in the entirely parthenogenetic superspecies *Apatania muliebris* (Trichoptera).**

- Various aspects of a remarkable complex of parthenogenetic taxa are reviewed, pros and cons being examined concerning their taxonomic status. *Apatania mercantoura* sp. n. is described from alpine wetlands in three localities (2350-2440 m a. s. l.) in the Parc National du Mercantour. This is the first discovery in France of a taxon belonging to this parthenogenetic complex; the known localities are almost at the highest altitudes known for a member of the *A. muliebris* complex, and the new species is possibly the most meridional of all taxa in this complex.

**Keywords:** Trichoptera - *Apatania* - parthenogenesis - alpine wetlands - Alps of Provence.

INTRODUCTION

The description by Mc Lachlan (1866-1867, 1876) of *Apatania muliebris* brought to light the existence of a remarkable entirely parthenogenetic (thelytoke) species of caddisflies from a spring habitat – later unfortunately destroyed – in southern England (Sussex). Subsequently a series of taxa considered as belonging to *A. muliebris* were described from various parts of the British Isles, of central and of northern Europe; a list of named taxa is in Barnard & O'Connor (1987); moreover, there are several known populations, possibly distinct, having received a name but not recognizable owing to lack of illustration [an exception: a population from W. Hungary (Nógrádi, 1994)].

In some publications illustrated taxa were wrongly named; for instance, this has been several times the case with “*A. muliebris*” (examples: Mosely, 1939; Nielsen, 1950 a; probably Elliott, 1971; Barnard & O'Connor, 1987; Ivanov & Grigorenko, 1991). The published illustration most correctly representing the genitalia of *A. muliebris* from the type locality is that in Schmid (1954: fig. 70), Burkhardt & Tobias (1982: figs 1-4), or Barnard & O'Connor (1987: fig. 4).

The problem of the status to be assigned to taxa in this parthenogenetic taxa complex has been much discussed, with various results. For some authors (Solem,

1985; Barnard & O'Connor, 1987) they all represent one very variable species; in our opinion, adopting this solution does not take into account all morphological and chorological evidence, "sweeping under the carpet" an exciting problem of taxonomy and biogeography. Nielsen (1969) and Burkhardt & Tobias (1982) argue that one species with several distinct subspecies is involved. Nielsen (1969: 314) admits the difficulty of such an approach; indeed, subspecies are geographic races potentially interbreeding with other ones – something not conceivable in the case of parthenogenetic insects. Solid arguments have been offered by Nielsen (1950 a) and by Schmid (1954) for the status of good species, and in Nielsen's publication we find this excellent observation: "... the parthenogenesis is as effective an isolation as any geographic barrier". For the new taxon described in the present paper we adopt this last solution. Nevertheless, we believe that a more correct one would be to consider *A. muliebris* as a superspecies comprising a series of prospecies; by adopting such an approach, we implicitly recognize (like Schmid, 1954: 35) the probable origin of all taxa in a common parthenogenetic and psychrostenotermic ancestor, as well as the character of Late-Glacial relicts of at least some of the recent offspring populations (Nielsen, 1950 a, 1950 b, 1974). Should be added that in some cases the picture can be obscured by intra-populational variability (Nielsen, 1950 a, 1969; Solem, 1985; Barnard & O'Connor, 1987); whereas in other cases such variability is described as very slight or practically absent (Burkhardt & Tobias, 1982; present paper).

Clearly, a thorough study of genetic structure could bring much light in this complex case. Unfortunately, this is already too late for several eradicated populations and/or destroyed habitats (Nielsen, 1974: Denmark; Burkhardt & Tobias, 1982: Schlitzer Land; Barnard & O'Connor, 1987: Sussex).

Various aspects have been discussed for this complex of parthenogenetic taxa. There is reliable published information on the – sometimes very dissimilar – life cycles and flight periods (i. a.: Klapalek, 1889; Nielsen, 1942, 1950 a, 1950 b; Elliott, 1971; Solem, 1985; Barnard & O'Connor, 1987). Interesting is the existing evidence on geographic distribution: many localities supporting large and often neighbouring populations in northern Europe; more sporadic distribution in central Europe; and extremely few isolated localities known in the southernmost parts of the general distribution area. In most cases the habitat of the parthenogenetic populations is represented by springs of all types, from lowland to alpine springs, including "wet alpine areas"; almost only in the northernmost localities are springs replaced by streams, some published evidence existing on curiously restricted distribution in some of them.

## DESCRIPTION

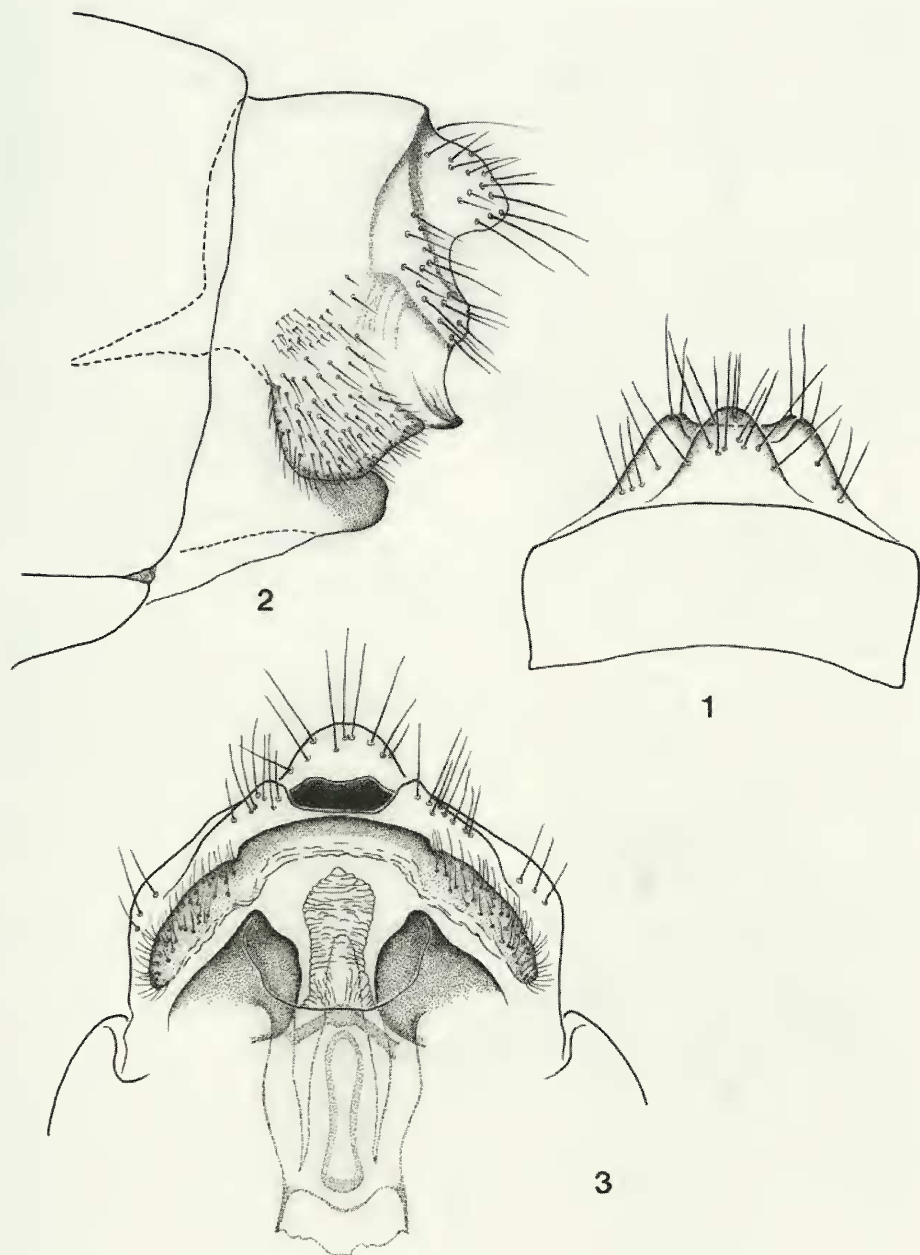
*Apatania mercantoura* sp. n.

Figs 1-6

*Material, localities, habitat*

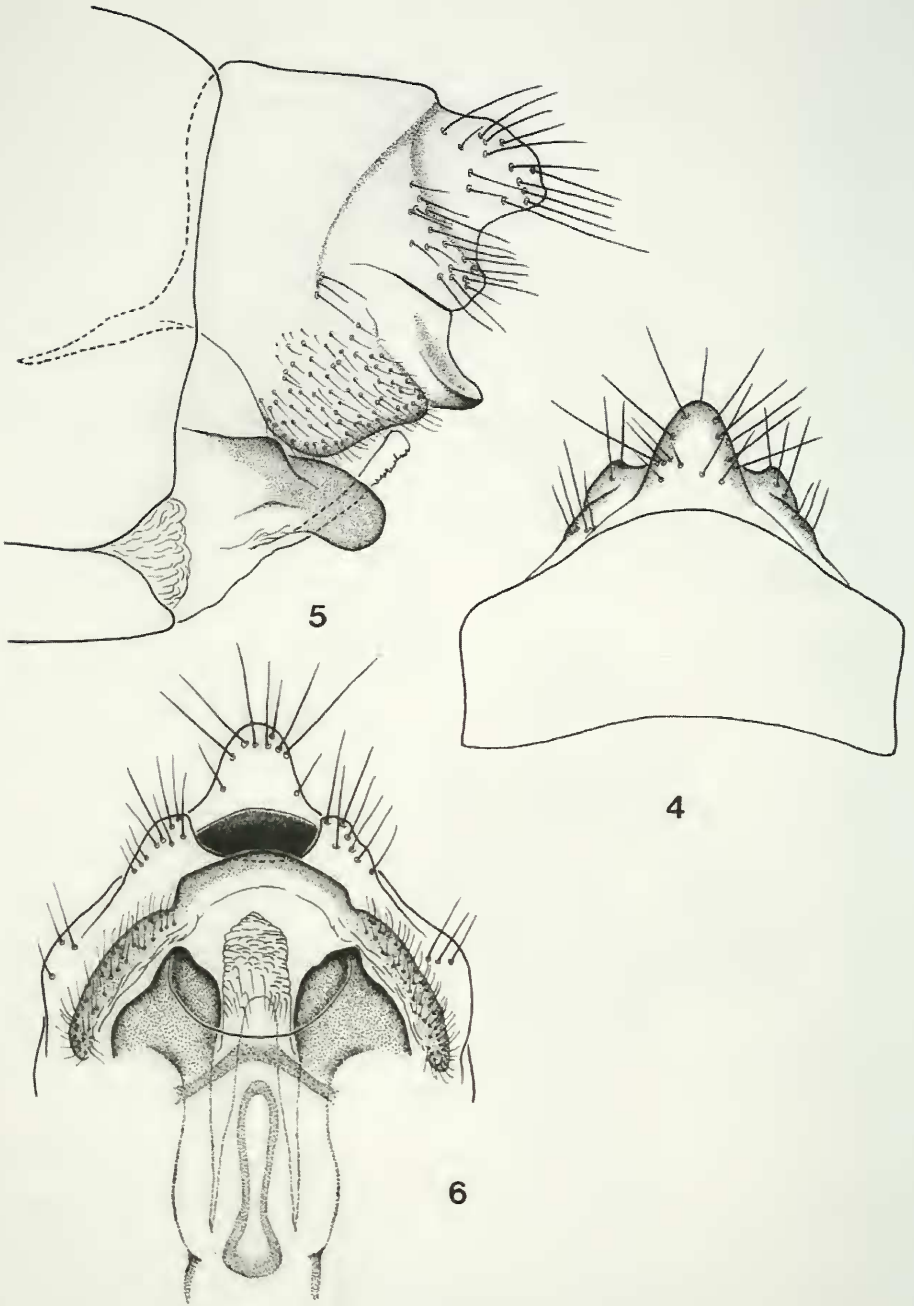
All sampling localities are in the Parc National du Mercantour (France, département Alpes Maritimes and département Alpes de Haute Provence).

1/. Alpine wetland (moorland drained by spring brooks and small streams) in the upper part of Vallon de Restefond, 2415 m a. s. l. (upper course of the Moutière, hydrographic network of the river Ubaye), département Alpes de Haute Provence:



FIGS 1-3

*Apatania mercantoura* sp. n., terminalia, specimen from Vallon de Restefond. 1: dorsal view; 2: lateral view; 3: ventral view.



Figs 4-6

*Apatania mercantoura* sp. n., terminalia, specimen from Col de la Cayolle. 4: dorsal view; 5: lateral view; 6: ventral view.

5 adult female specimens, 23.VII.2002, coll. M. Derrien (holotype and 4 paratypes); 9 mature female pupae with well developed genitalia, 18 pupae incompletely developed, 5 larvae, 24.VI.2003, coll. M. Derrien & J. Giudicelli.

2/. Alpine wetland, Col de la Cayolle, 2350 m a. s. l. (upper course of the Bachelard, tributary of the river Ubaye), département Alpes de Haute Provence: 1 adult female specimen, 3 mature female pupae with well developed genitalia, 3 larvae, 25.VI.2003, coll. M. Derrien.

3/. Alpine wetland, above Lake Vens, 2440 m a. s. l. (upper part of the Tinée basin), département Alpes Maritimes: 1 mature female pupa with well developed genitalia, 26.VI.2003, coll. M. Derrien.

Holotype (adult female specimen from Restefond) kept in the Zoological Museum Amsterdam. All adult specimens or mature pupae with well developed genitalia mentioned above are designated as paratypes and are deposited either in the Muséum d'histoire naturelle de Genève, or in the Zoological Museum Amsterdam. All specimens are kept in alcohol.

#### *Description of the female*

Forewing length: 7.6 - 8.5 mm.

Proximal spiniform projection of segment IX long. Segment X: dorsal (single) projection massive, well protruding, distal margin slightly variable, but never very slender; in dorsal view it is triangular, devoid of a longitudinal keel, margins converging towards a very blunt apex; this dorsal projection is separated by deep sinuses from the rather well protruding, angular, median projections (bordering the anus); in their turn these median projections are separated by similarly large sinuses from the lower projection ("supragenital plate") which is in lateral view strong, not sharply pointed, reaching almost as far as the dorsal projection (in ventral view: broad, not strongly vaulted, laterally limited by small but distinct loops).

Comparison with all published evidence shows that this is a clearly distinct species; but it would be almost equally meaningless in this case to try to find more similarity with some already described taxon, than to speak of kinship; maybe there is some similarity with *A. scherfi* Burkhardt & Tobias, 1982.

#### *Differential diagnosis*

*A. mercantoura* sp. n. can be distinguished from the various taxa described in the "*A. muliebris* complex" by the following characters of the female genitalia (segment X): dorsal projection massive in lateral view, in dorsal view with very blunt apex and devoid of a longitudinal keel; deep sinuses separating (lateral view) the dorsal projection from the median one, and this last from the strong, not sharply pointed lower projection.

#### *Etymology*

From Parc National du Mercantour (type locality).

#### DISCUSSION

This is the first time that a parthenogenetic *Apatania* is discovered from France. The mention from "France, Rhone Valley" in Ivanov & Grigorenko (1991: 51) is

erroneous and part of a true imbroglio; there is no "specimen from France studied by F. Schmid in 1954": in Schmid (1954: 36) there is a mention of "... Suisse, dans la vallée du Rhône: Chateauneuf ..." (Chateauneuf is in Switzerland between Chamoson and Muveran; N 46° 13', E 7° 20'); moreover, it is clear that when introducing "*Apatania schmidiana* Ivanov et Grigorenko, nomen novum" the authors referred to fig. 70 in Schmid's publication, prepared from a specimen from Mc Lachlan's type locality of *A. muliebris*, a new name being superfluous.

*A. mercantoura* sp. n. is quite possibly the most meridional of all taxa in the *muliebris* complex. The only more meridional one could be *A. theischingerorum* Malicky, 1981, of which only one (female) specimen is known, from a locality in prov. Cuenca, Spain; but morphological evidence, and lack of evidence for parthenogenesis, render this case slightly problematic.

The localities in the Parc National du Mercantour are almost at the highest altitudes known for a member of the *A. muliebris* complex. To the best of our knowledge, only *A. helvetica* Schmid, 1954, has been sampled in some higher localities of the Swiss Alps (from 1800 to 2600 m a. s. l.; Schmid, 1954: 37).

An interesting element of the alpine fauna of southern France, inhabiting, together with other remarkable species, like *Alpopsyche ucenorum* (Mc Lachlan), a peculiar and isolated high mountain freshwater habitat, *A. mercantoura* deserves complete protection as well as a thorough study of the life cycle. The authors intend to do such a study, during which an attempt will be made for finding characters enabling to distinguish the last instar larva of the new species from the small number of already published descriptions of "*A. muliebris*" (*sic* !) larvae.

#### ACKNOWLEDGEMENTS

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